FIG. 1

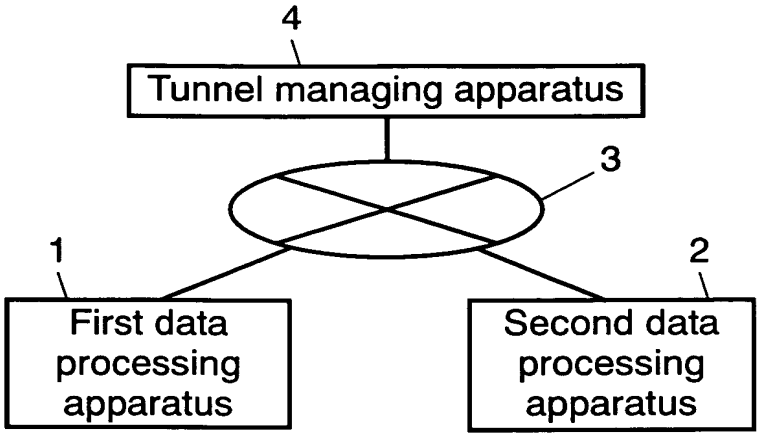

4
Tunnel managing apparatus
3
1
2
First data processing apparatus
Second data processing apparatus

FIG. 2

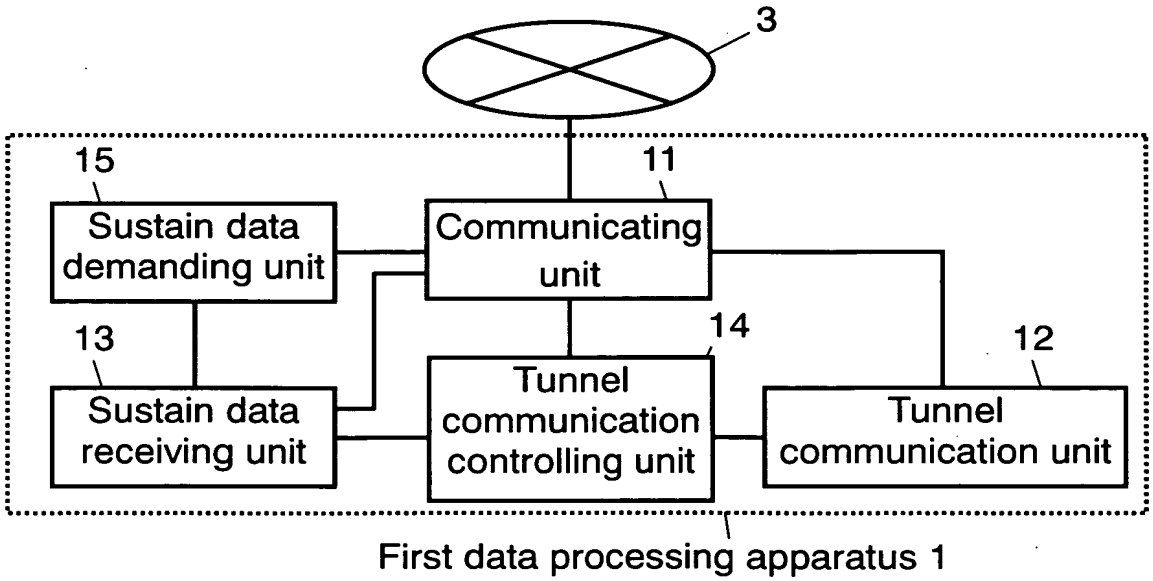

3
15
11
Sustain data demanding unit
Communicating unit
13
14
12
Sustain data receiving unit
Tunnel communication controlling unit
Tunnel communication unit
First data processing apparatus 1

FIG. 3

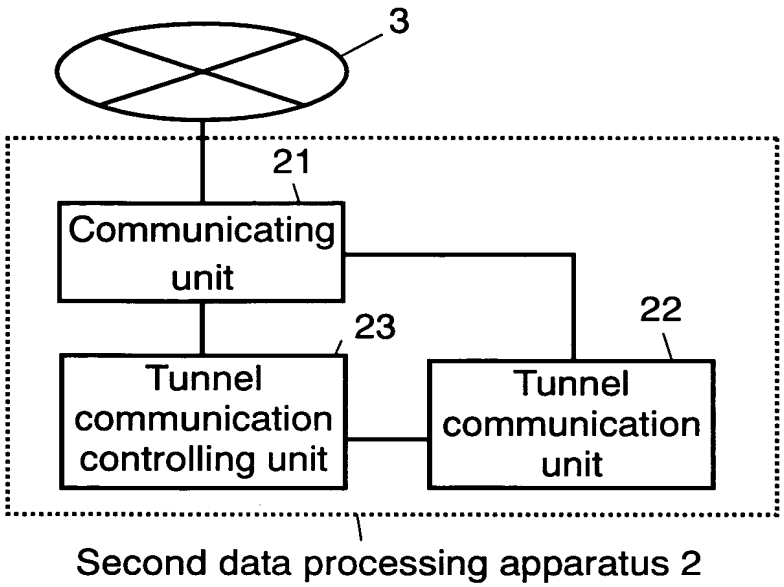

3
21
Communicating unit
23
22
Tunnel communication controlling unit
Tunnel communication unit
Second data processing apparatus 2

FIG. 4

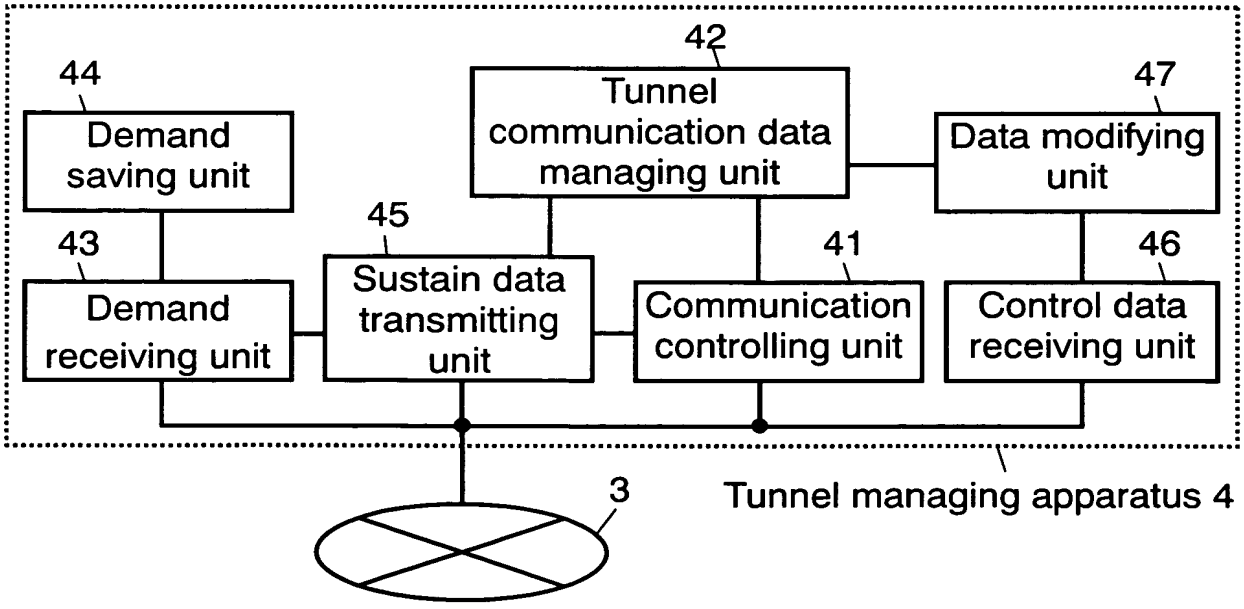

42
44
Tunnel communication data managing unit
47
Demand saving unit
Data modifying unit
45
43
41
46
Sustain data transmitting unit
Demand receiving unit
Communication controlling unit
Control data receiving unit
3
Tunnel managing apparatus 4

FIG. 5

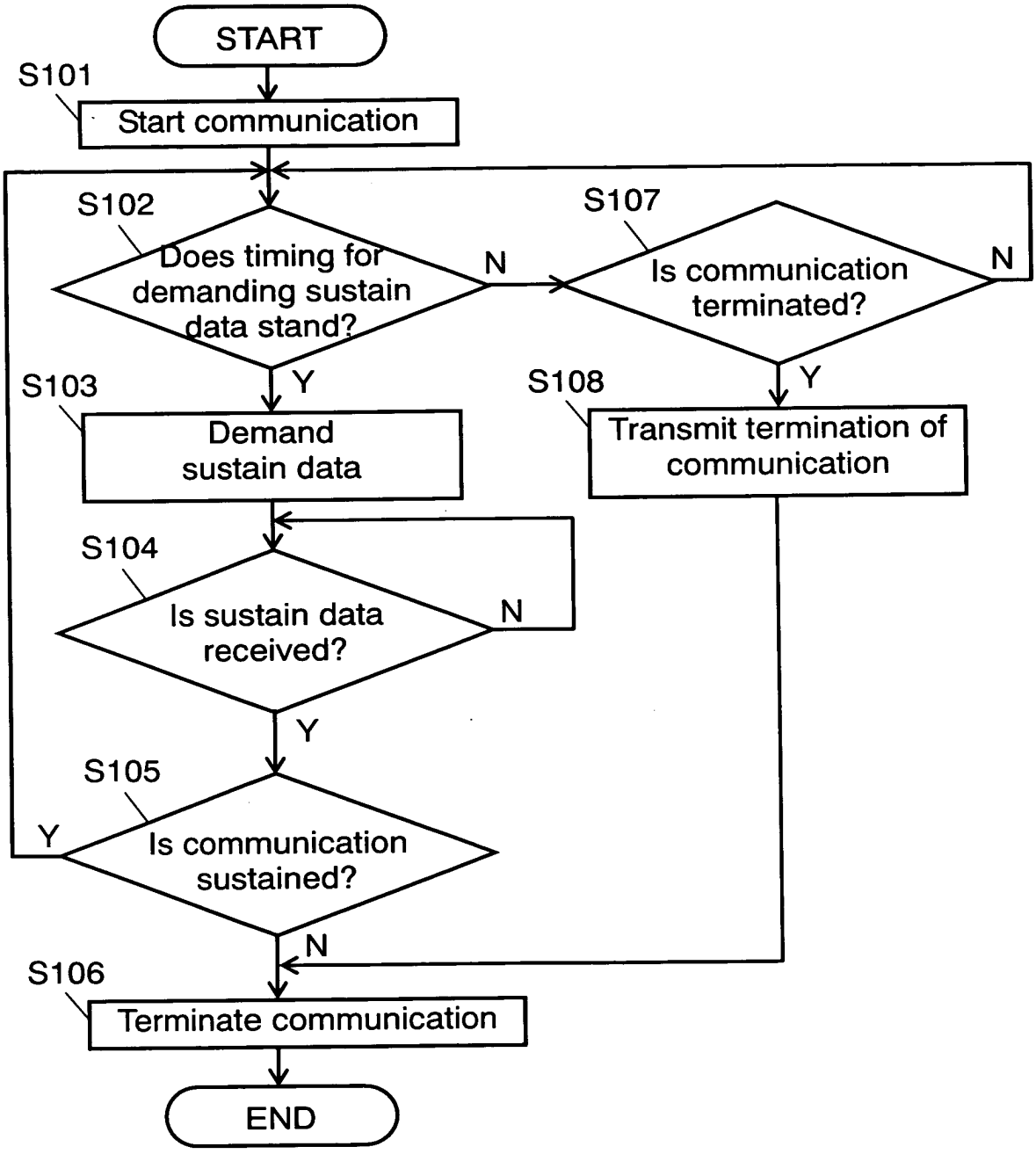

START
S101
Start communication
S102
Does timing for demanding sustain data stand?
N
S107
Is communication terminated?
N
Y
S103
Demand sustain data
S108
Transmit termination of communication
S104
Is sustain data received?
N
Y
S105
Is communication sustained?
Y
N
S106
Terminate communication
END

FIG. 6

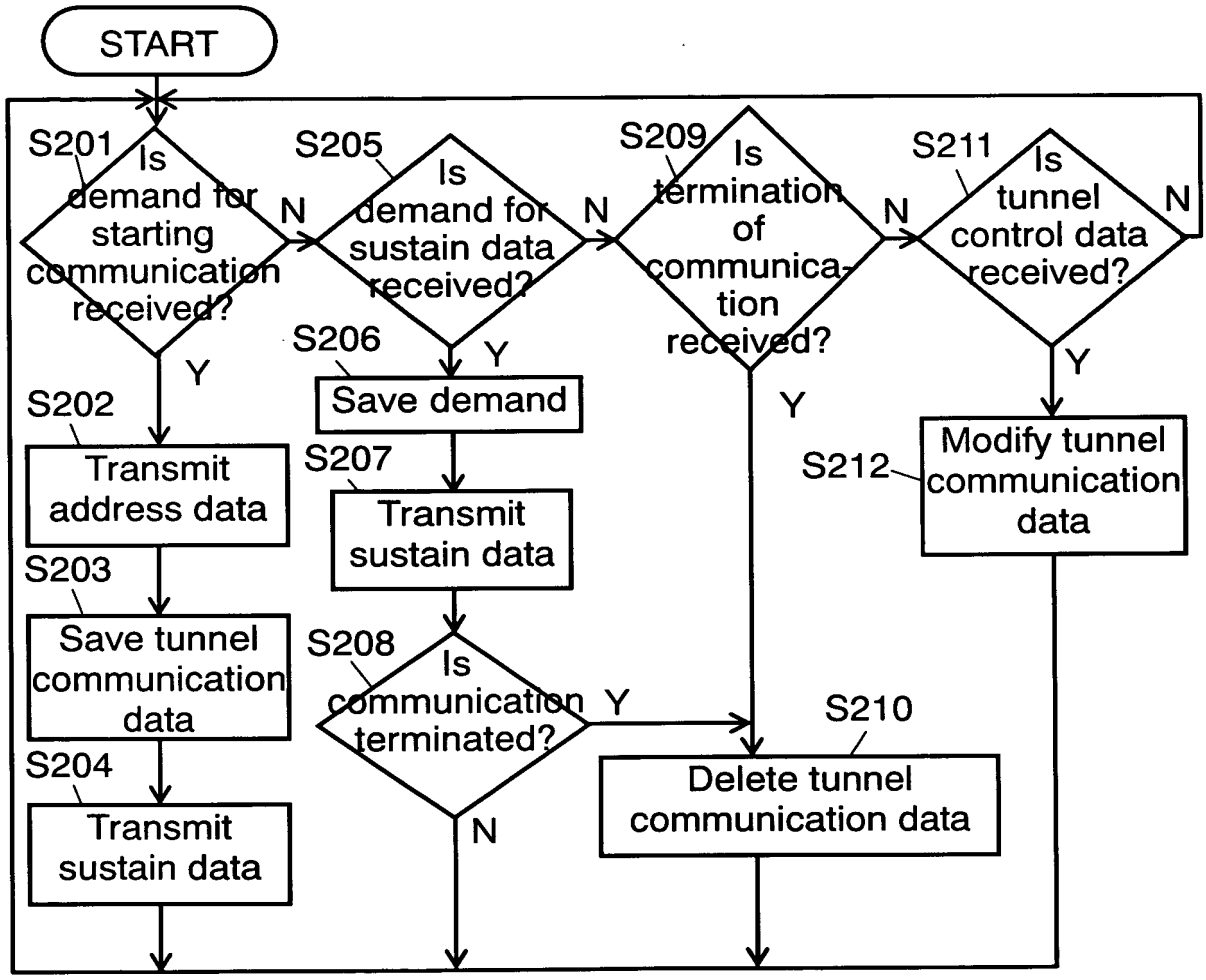

START
S201
Is demand for starting communication received?
N
S205
Is demand for sustain data received?
N
S209
Is termination of communication received?
N
S211
Is tunnel control data received?
N
Y
Y
Y
Y
S202
Transmit address data
S203
Save tunnel communication data
S204
Transmit sustain data
S206
Save demand
S207
Transmit sustain data
S208
Is communication terminated?
Y
N
S210
Delete tunnel communication data
S212
Modify tunnel communication data

FIG. 7

User identifier	Device identifier	IP address	Available time
U001	D001	155.32.10.10	300'
	D008	———	
U002	D002	202.132.10.6	———
⋮	⋮	⋮	⋮

FIG. 8A

First device identifier	Second device identifier	Remaining of available time
D001	D002	300'0"

FIG. 8B

First device identifier	Second device identifier	Remaining of available time
D001	D002	253'45"

FIG. 8C

First device identifier	Second device identifier	Remaining of available time
D001	D002	0'0"

FIG. 9

Device identifier	Year. Month. Day	Time
D001	2003.12.10	18:52:18
D001	2003.12.10	19:02:13
⋮	⋮	⋮

FIG. 10

INDEX	First device identifier	Second device identifier	Communication allow/disallow flag
1	D001	D002	1
2	D005	D006	0
⋮	⋮	⋮	⋮

FIG. 11

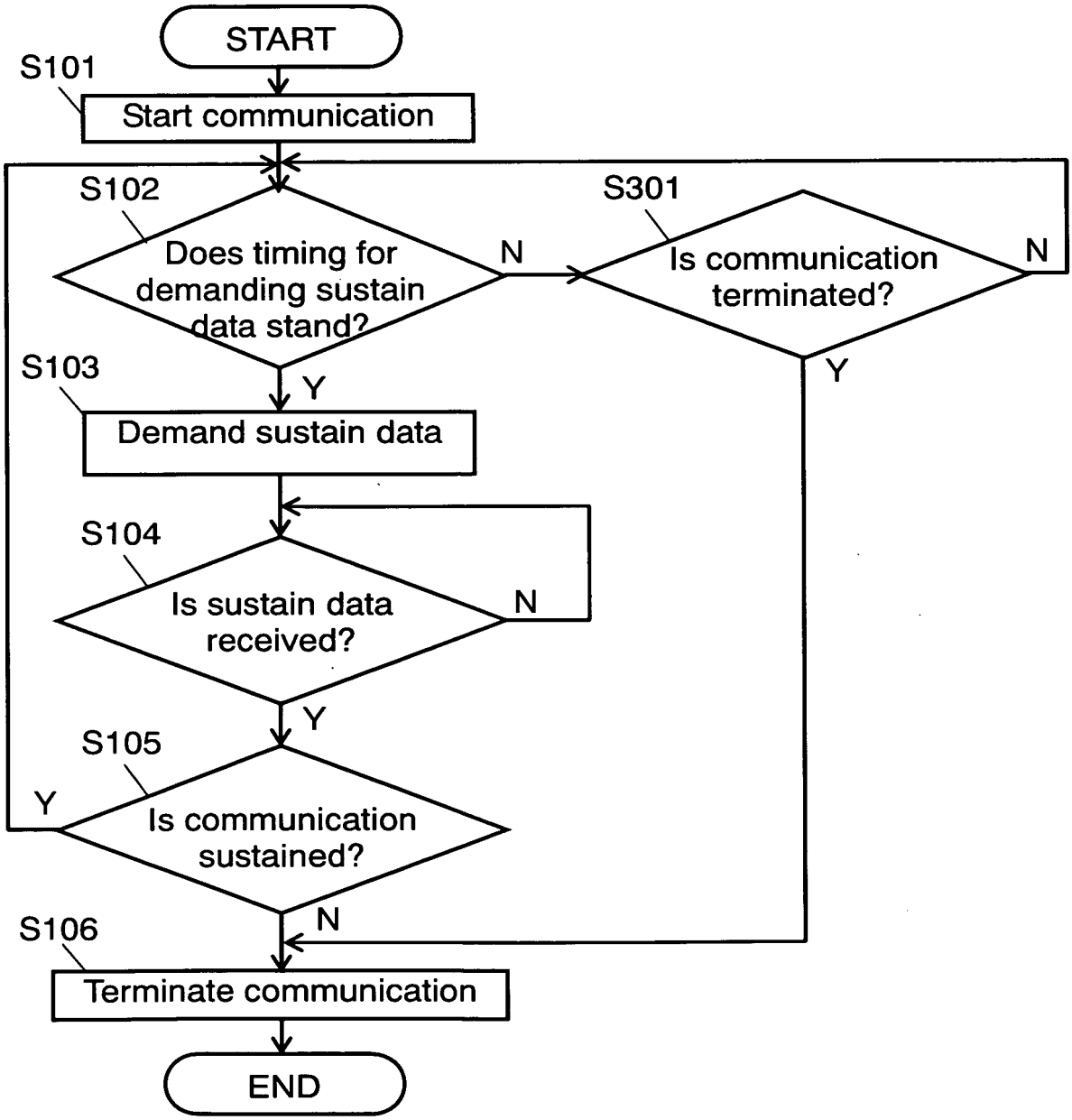


FIG. 12

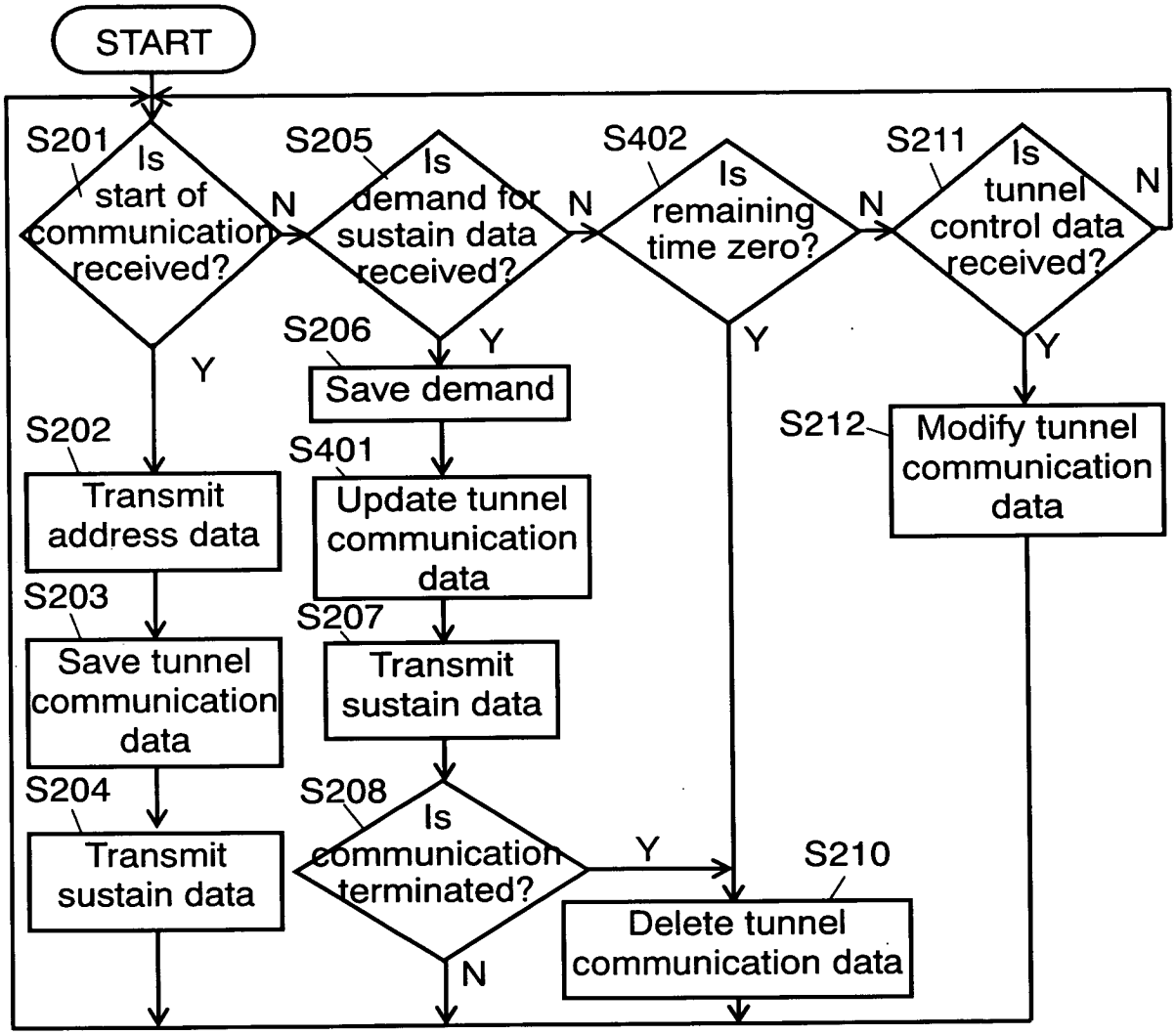

START
S201
Is start of communication received?
N
Y
S205
Is demand for sustain data received?
N
Y
S402
Is remaining time zero?
N
Y
S211
Is tunnel control data received?
N
Y
S202
Transmit address data
S203
Save tunnel communication data
S204
Transmit sustain data
S206
Save demand
S401
Update tunnel communication data
S207
Transmit sustain data
S208
Is communication terminated?
Y
N
S210
Delete tunnel communication data
S212
Modify tunnel communication data

FIG. 13A

INDEX	First device identifier	Second device identifier	Remaining of time	Sum time	Maximum of time
1	D001	D002	9'45"	10'	300'
⋮	⋮	⋮	⋮	⋮	⋮

FIG. 13B

INDEX	First device identifier	Second device identifier	Remaining of time	Sum time	Maximum of time
1	D001	D002	10'15"	20'	300'
⋮	⋮	⋮	⋮	⋮	⋮

FIG. 13C

INDEX	First device identifier	Second device identifier	Remaining of time	Sum time	Maximum of time
1	D001	D002	15"	300'	300'
2	D003	D004	4'45"	20'	—
⋮	⋮	⋮	⋮	⋮	⋮

FIG. 13D

INDEX	First device identifier	Second device identifier	Remaining of time	Sum time	Maximum of time
1	D003	D004	7'32"	40'	—
⋮	⋮	⋮	⋮	⋮	⋮

FIG. 14

INDEX	First device identifier	Second device identifier	Start time of communication	Maximum of time
1	D001	D002	2003.12.10 18:24:15	300'
2	D003	D004	2003.12.10 20:39:30	60'
⋮	⋮	⋮	⋮	⋮

FIG. 15

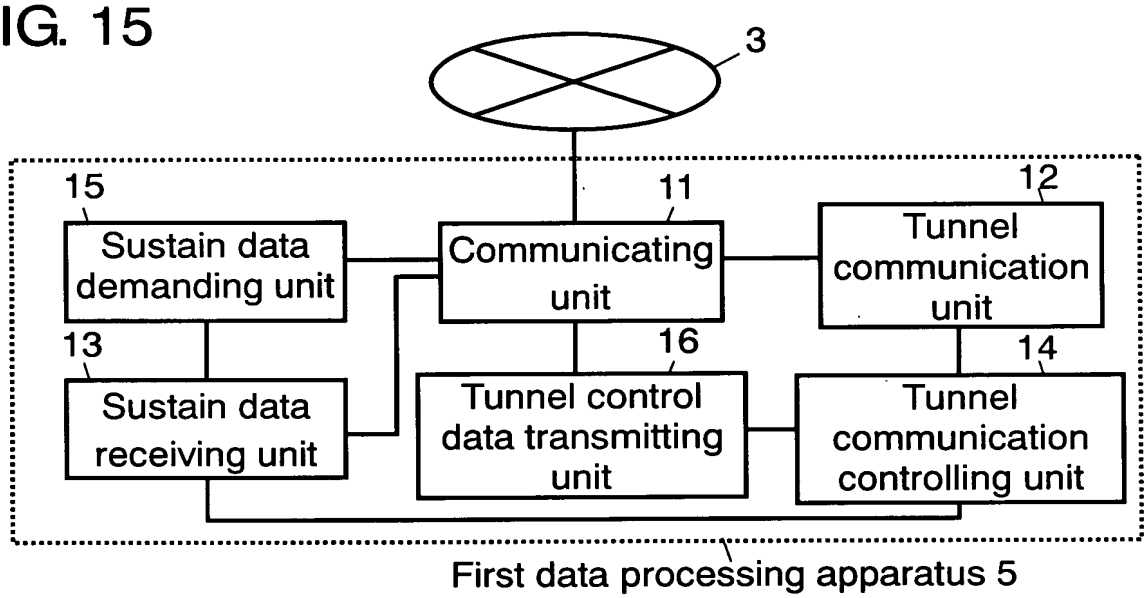


FIG. 16

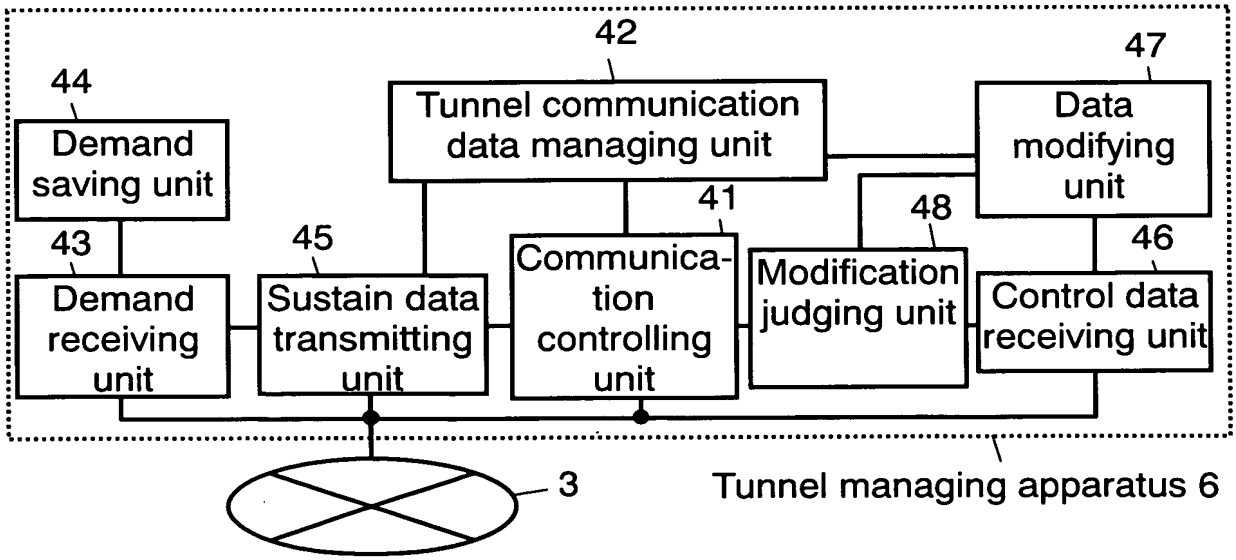


FIG. 17

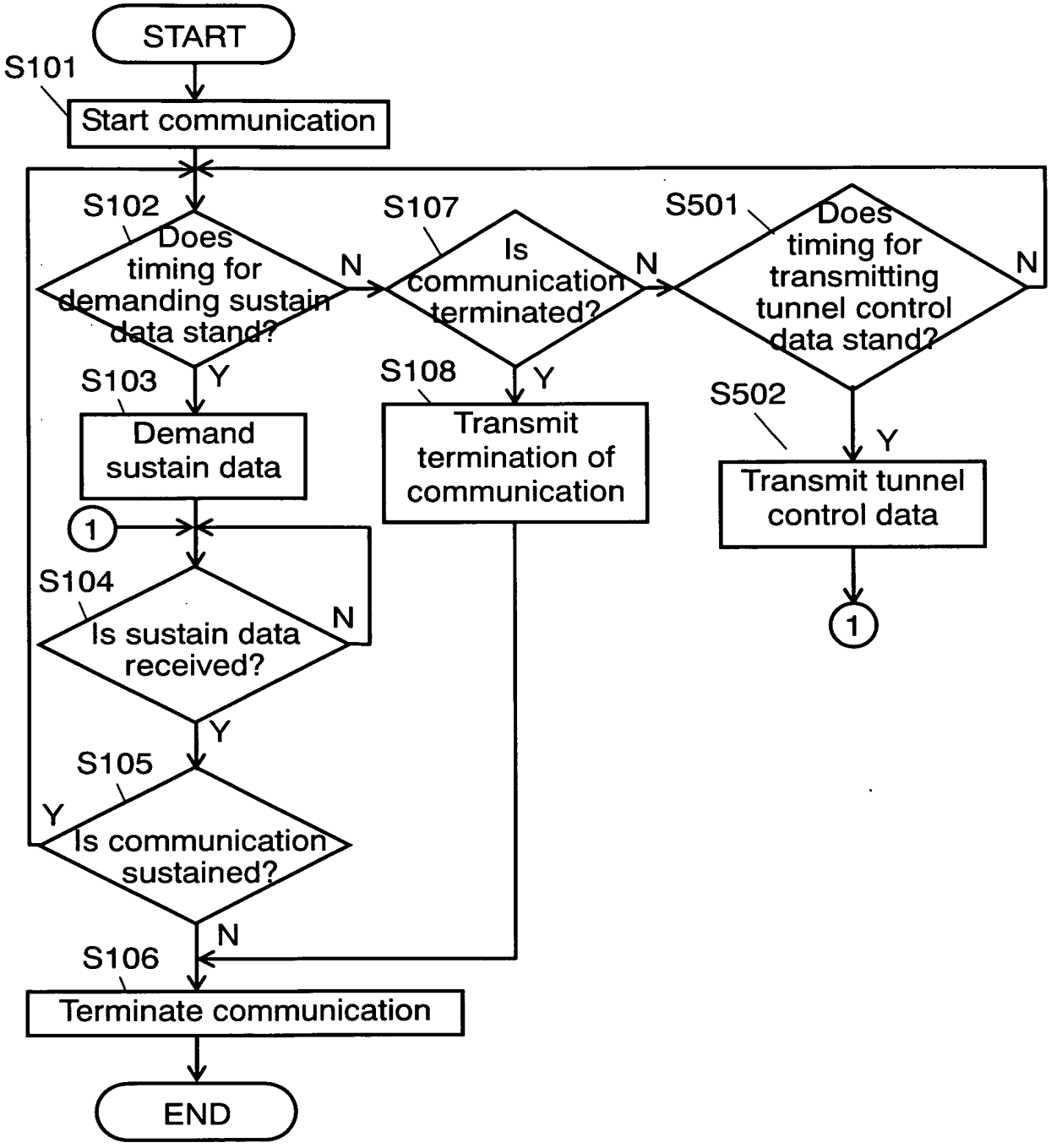

START
S101
Start communication
S102
Does timing for demanding sustain data stand?
N
Y
S103
Demand sustain data
1
S104
Is sustain data received?
N
Y
S105
Is communication sustained?
Y
N
S107
Is communication terminated?
N
Y
S108
Transmit termination of communication
S501
Does timing for transmitting tunnel control data stand?
N
Y
S502
Transmit tunnel control data
1
S106
Terminate communication
END

FIG. 18

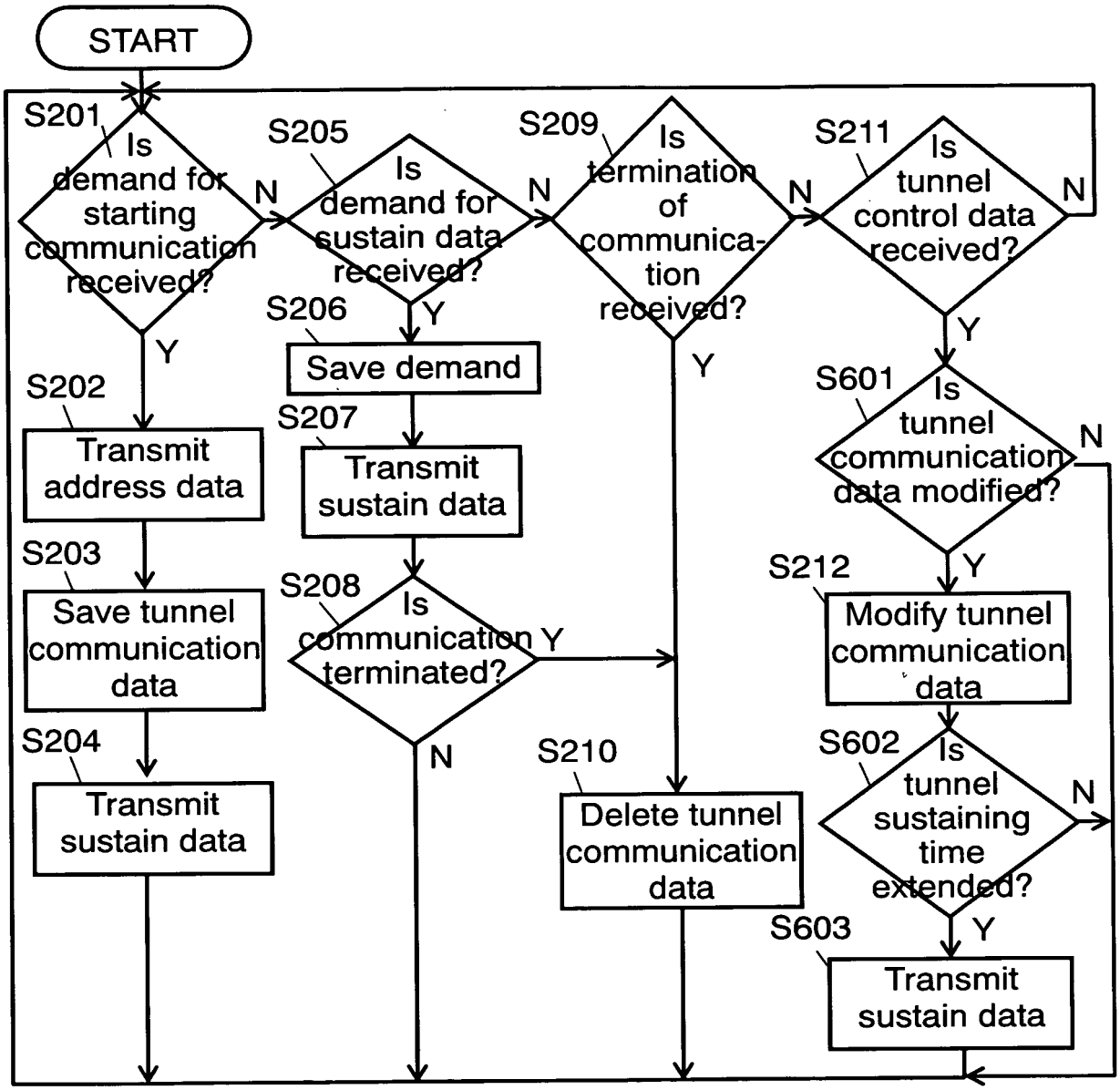


FIG. 19

User identifier	Credit card No.
U001	Registered
U002	Not registered
⋮	⋮

FIG. 20

First device identifier	Second device identifier	Remaining of available time
D001	D002	323'05"

FIG. 21

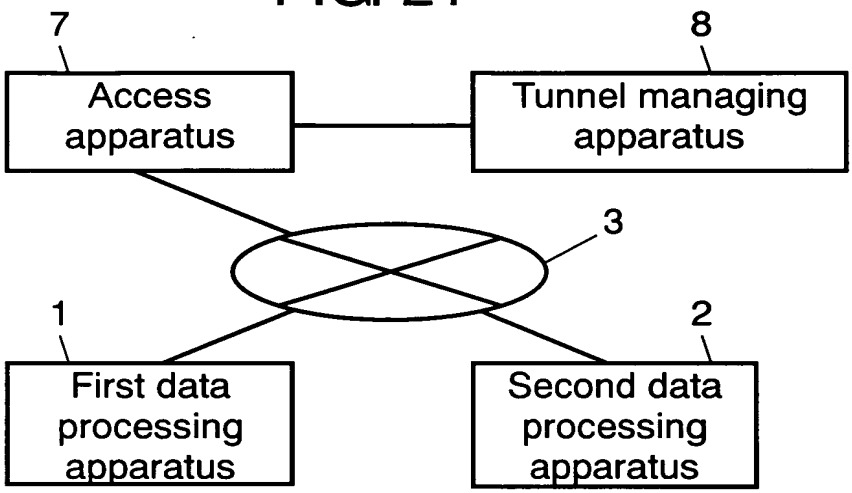


FIG. 22

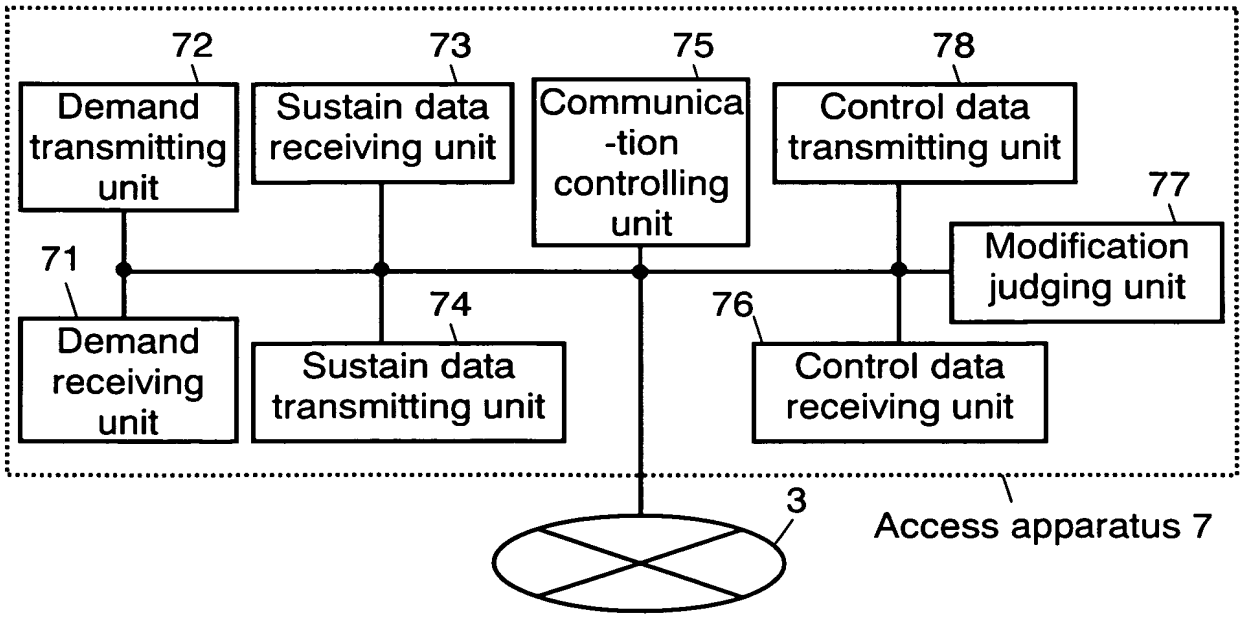


FIG. 23

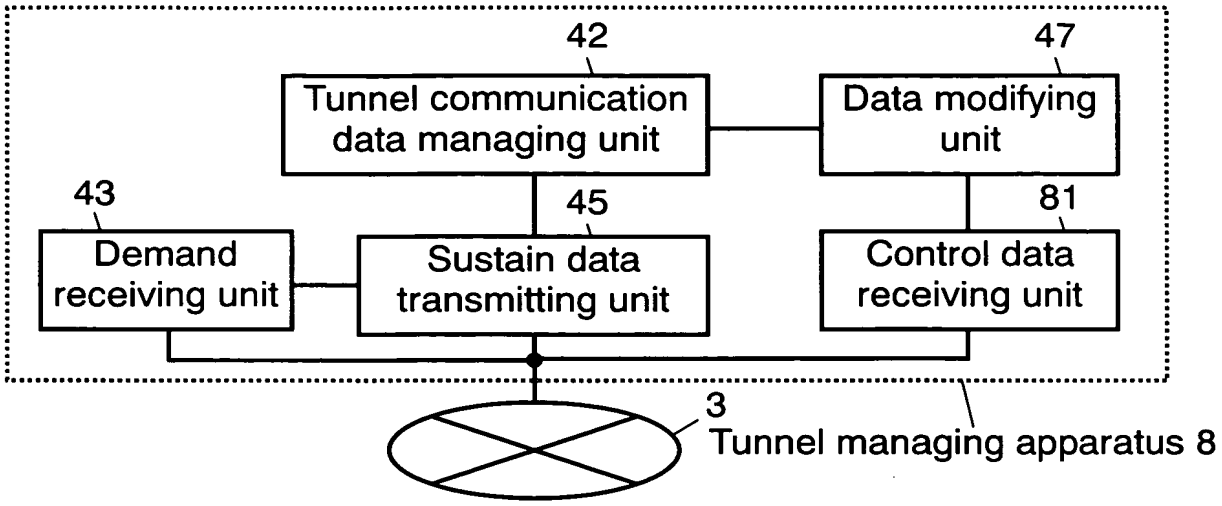

42
Tunnel communication data managing unit
47
Data modifying unit
43
Demand receiving unit
45
Sustain data transmitting unit
81
Control data receiving unit
3
Tunnel managing apparatus 8

FIG. 24

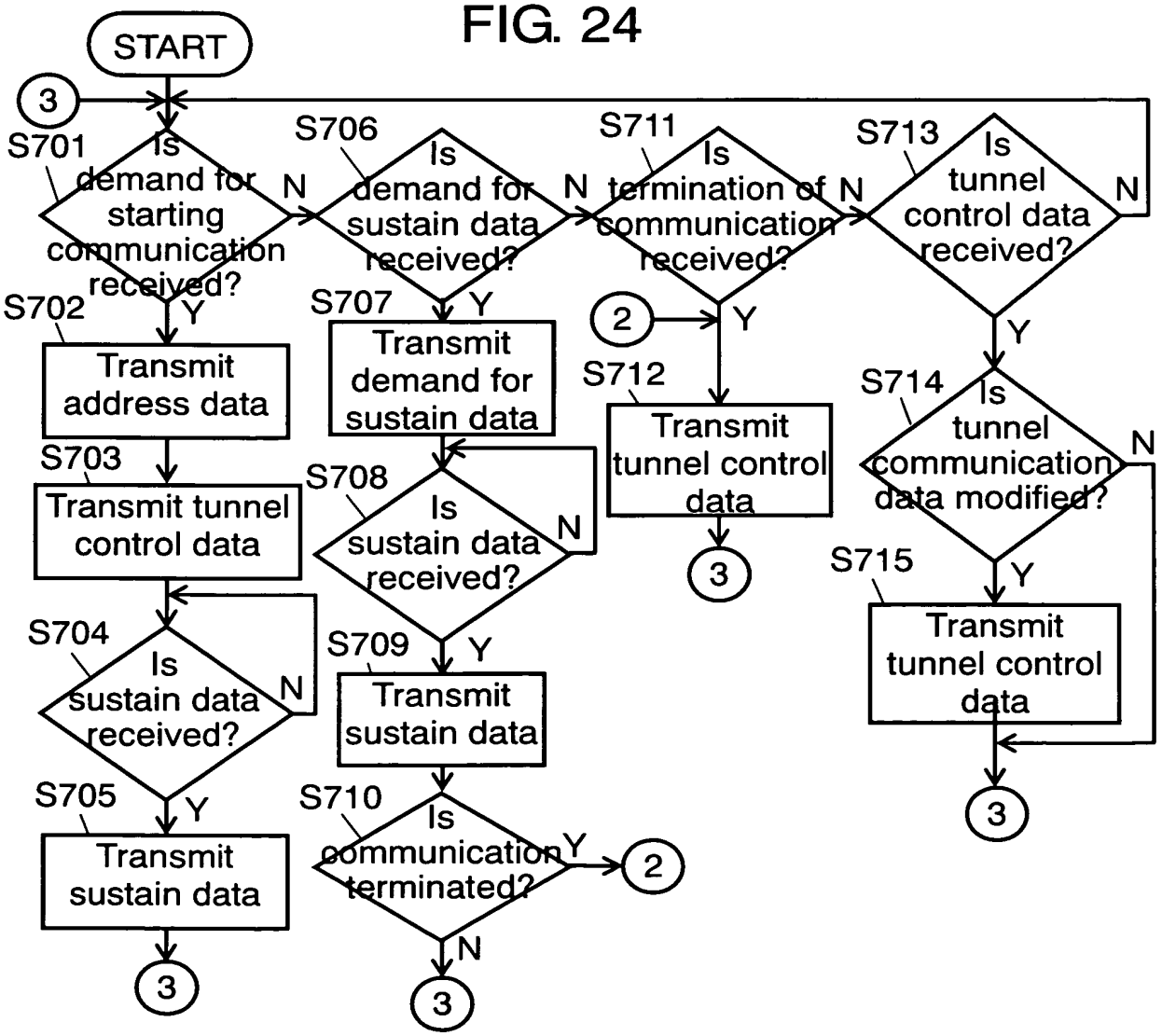
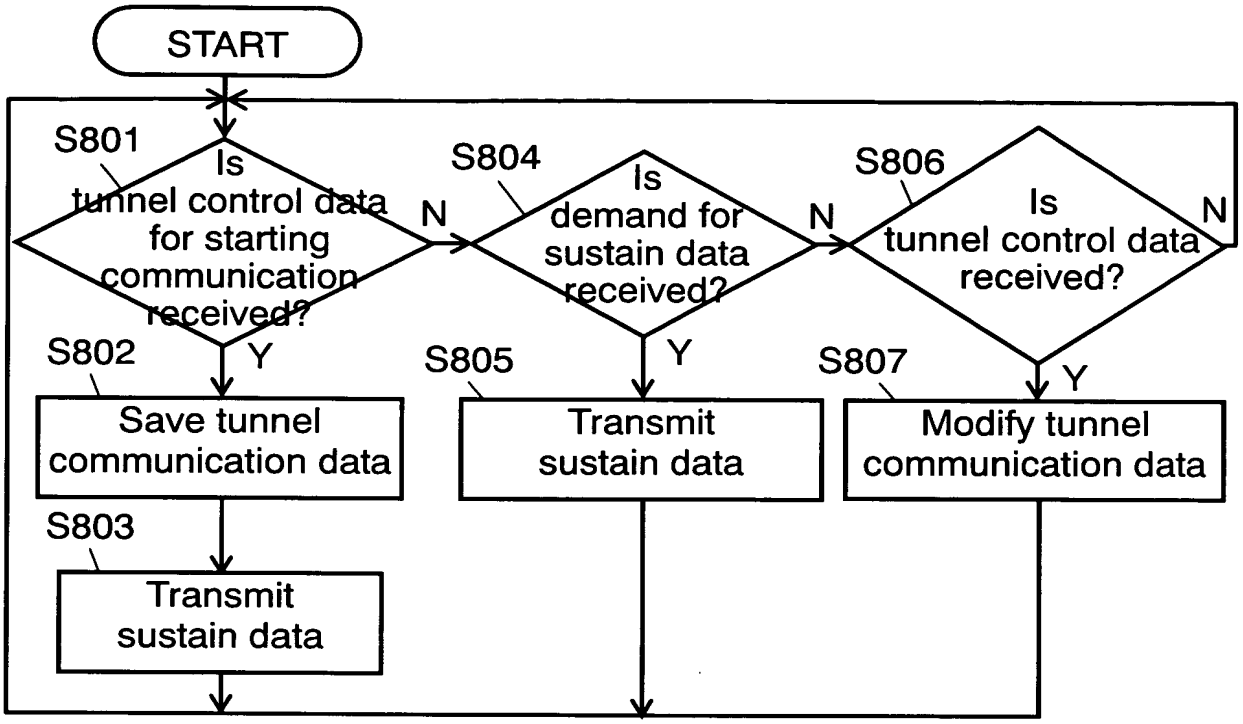

START
3
S701
Is demand for starting communication received?
N
Y
S702
Transmit address data
S703
Transmit tunnel control data
S704
Is sustain data received?
N
Y
S705
Transmit sustain data
3
S706
Is demand for sustain data received?
N
Y
S707
Transmit demand for sustain data
S708
Is sustain data received?
N
Y
S709
Transmit sustain data
S710
Is communication terminated?
Y
2
N
3
S711
Is termination of communication received?
N
Y
2
S712
Transmit tunnel control data
3
S713
Is tunnel control data received?
N
Y
S714
Is tunnel communication data modified?
N
Y
S715
Transmit tunnel control data
3

FIG. 25


START
S801
Is tunnel control data for starting communication received?
N
S804
Is demand for sustain data received?
N
S806
Is tunnel control data received?
N
Y
S802
Save tunnel communication data
S803
Transmit sustain data
Y
S805
Transmit sustain data
Y
S807
Modify tunnel communication data